



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/520,117

09/23/2005

Pieter Nammensma

2001-1368

9540

466 7590 06/30/2009

YOUNG & THOMPSON  
209 Madison Street  
Suite 500  
ALEXANDRIA, VA 22314

EXAMINER

CHUO, TONY SHENG HSIANG

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

06/30/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/520,117	<b>Applicant(s)</b> NAMMENSMA ET AL.	
	<b>Examiner</b> Tony Chuo	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 11-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/3/05</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 11-16 in the reply filed on 5/6/09 is acknowledged. The non-elected claims 17-20 have been cancelled in response to the restriction requirement.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted on 1/3/05 was filed on 1/3/05. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Examiner's note: The WO/01/43524 reference was incorrectly listed in the International Search Report as a "X" reference. The WO/01/43524 reference does not expressly teach the limitation, "a porous layer with a thickness of at most 100  $\mu\text{m}$  that is electron-conducting in the operational state is applied to said stress compensation layer on the side away from the anode support".

### ***Drawings***

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference number “8” in Figure 1 is not described in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase “Not Applicable” should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.

Art Unit: 1795

- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 11-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 11, it is unclear whether the thickness of the porous layer is the thickness of the final structure (after sintering) or an intermediate structure (before sintering). The specification discloses that the thickness of such a layer is less than 100  $\mu\text{m}$  at the time of application, so that a layer thickness of 10 – 20  $\mu\text{m}$  results on sintering.

Regarding claim 13, it is unclear whether the electron-conducting layer comprises nickel, nickel oxide, or both nickel and nickel oxide. The specification states that "A porous electron-conducting layer, such as a layer of nickel oxide which on sintering and reduction is converted to porous nickel ...". Claim 13 is construed as reciting an electron-conducting layer that comprises a nickel layer.

Claim 14 recites the limitation "the substrate" in line 3. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 11-13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar et al (US 2004/0121222) in view of Mardilovich et al (US 2004/0081878).

The Sarkar reference discloses an anode-supported fuel cell "2" comprising: a buffer layer "22" (anode support), an anode layer "14", an electrolyte layer "12", a cathode layer "10", and a current collector "18", wherein the buffer layer is provided with an anode support layer "16" (stress compensation layer) on the side opposite the anode layer, wherein the anode support layer is a porous layer extending without essential interruptions, and wherein the anode support layer (stress compensation layer) has a porosity of about 30% (See paragraphs [0023],[0026],[0031],[0033]).

However, Sarkar et al does not expressly teach a porous layer with a thickness of at most 100  $\mu\text{m}$  that is electron-conducting in the operational state that is applied to the stress compensation layer on the side away from the anode support, wherein the electron-conducting layer has a thickness of 10-20  $\mu\text{m}$  in the operational state, wherein the electron-conducting layer comprises a nickel/nickel oxide layer. The Mardilovich reference discloses a current collector "20" for a solid oxide fuel cell that has a thickness of about 10  $\mu\text{m}$  and is made of nickel (See paragraphs [0037],[0042],[0053]). It also discloses that the current collector "20" may be any suitable size, shape, or configuration (See paragraph [0064]). Examiner's note: It is well known in the art that current collectors are porous layers such as meshes.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Sarkar fuel cell by substituting the current collector for a current collector that has a thickness of 10  $\mu\text{m}$  that is porous layer made of nickel in order to minimize the thickness of the current collector while increasing the current collector efficiency (See paragraph [0025]). In addition, the substitution of one known type of fuel cell current collector for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

10. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarkar et al (US 2004/0121222) in view of Mardilovich et al (US 2004/0081878) as applied to claim 11 above, and further in view of Hartvigsen et al (US 6265095).

However, Sarkar et al as modified by Mardilovich et al does not expressly teach a stress compensation layer that is provided with a regular pattern of holes extending from the anode support to the electron-conducting layer, wherein the holes have an internal opening of at most 1mm. The Hartvigsen reference discloses a compliant sheet "70" (stress compensation layer) for a solid oxide fuel cell that is provided with a regular pattern of openings "78" (holes) extending through the compliant sheet, wherein the openings are approximately 0.05 inches (1.27 mm) wide (See column 3, lines 64-66).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Sarkar/Mardilovich fuel cell to include a stress compensation layer that is provided with a regular pattern of holes extending from the anode support to the electron-conducting layer, wherein the holes have an internal opening of 1.27 mm in order to form holes that permit fuel passing on either side of the compliant sheet to react with the anode (See column 4, lines 50-54). In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Sarkar fuel cell to include a stress compensation layer with holes that have an internal opening of at most 1mm because changes in size were held to have been obvious (*In re Rose*, 220 F.2d. 459, 463, 105 USPQ 237, 240 (CCPA 1955)). In addition, there is no evidence of criticality of the size of the holes.

However, Sarkar et al as modified by Mardilovich et al and Hartvigsen et al does not expressly teach holes that are hexagonal. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Sarkar/Mardilovich/Hartvigsen fuel cell to include holes that are hexagonal because



Art Unit: 1795

changes in shape were held to have been obvious (*In re Dailey* 149 USPQ 47, 50 (CCPA 1966)).

11. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donelson et al (US 6492053).

The Donelson reference discloses a fuel cell comprising: a sheet "40" (anode support), an anode "18", an electrolyte layer "20", and a cathode layer "22", wherein the sheet "40" is provided with a corrugated sheet "42" (stress compensation layer) that is a porous layer extending without essential interruptions; and a sheet "38" (porous layer) with a thickness of about 230  $\mu\text{m}$  that is electron conducting in the operational state that is applied to the sheet "42" on the side away from the anode support (See column 5 line 45 to column 6 line 60 and Figure 1). It also discloses a sheet "38" that comprises expanded nickel mesh (See column 6 lines 57-58). It also discloses a sheet "42" that is provided with a regular pattern of holes extending from the sheet "40" to the sheet "38" (See Figure 2). Examiner's note: The openings formed by the nickel mesh are construed as holes.

However, Donelson et al does not expressly teach a porous layer with a thickness of at most 100  $\mu\text{m}$  or a thickness of 10 – 20  $\mu\text{m}$ ; or holes having an internal opening of at most 1 mm. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Donelson fuel cell to include a porous layer with a thickness of at most 100  $\mu\text{m}$  or a thickness of 10 – 20  $\mu\text{m}$ ; or holes having an internal opening of at most 1 mm because changes in size were held to have

Art Unit: 1795

been obvious (*In re Rose*, 220 F.2d. 459, 463, 105 USPQ 237, 240 (CCPA 1955). In addition, there is no evidence of criticality of the thickness of the porous layer or the size of the holes.

However, Donelson et al does not expressly teach holes that are hexagonal. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Donelson fuel cell to include holes that are hexagonal because changes in shape was held to have been obvious (*In re Dailey* 149 USPQ 47, 50 (CCPA 1966)).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

Art Unit: 1795

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/  
Primary Examiner, Art Unit 1795